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In recent years, biocatalysis has been providing a unique stereoselective and green tool in synthetic organic chemistry. Single enzymes, either soluble or immobilized, have been used in many different reactions [1]. Currently, the idea of using multi-enzymatic systems for industrial production of chemical compounds becomes more and more attractive [2]. Multi-enzymatic processes use two or more enzymes to catalyse reactions in a defined pathway via a cascade, a parallel, or a network configuration [3]. Such schemes overcome many of the conventional problems with integrating biocatalysis such as media, temperature and pH swaps.

One of the key issues in the development of an enzymatic process is the selection of the reactor(s) [4, 5]. Multi-enzymatic process contains more than one reaction steps. Thus, the choices and combinations of types of catalyst and reactor are much more than those for a single enzymatic process. It is necessary therefore to attempt a classification and analysis of these reactor types to facilitate the selection of the correct type of the reactor for a sucessful multi-enzymatic process.

In this presentation, an analysis applying the approach of reaction engineering to evaluate reactors for multi-enzymatic processes has been carried out. The evaluation considers the kinetic constraints, the catalyst constraints and the reaction medium. These factors determine the type and the operational mode of the reactor. The results indicate the optimal choices of the reactors which can make the best use of the available enzymes.

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